



Clearing the Waters

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New Mexico Environment Department

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RESTORING NEW MEXICO'S PONDEROSA PINE FORESTS

By Abe Franklin

Background

Ponderosa pine forests, or areas once supporting ponderosa pine forest, cover approximately 4.7 million acres in New Mexico. Virtually all ponderosa pine forests were shaped by frequent ground fires until the late nineteenth century; now these forests are largely shaped by the absence of fire.

Scientists at Northern Arizona University's Laboratory of Tree-Ring Research have learned, by analyzing fire scars in old ponderosa pines across the southwest, that fires burned every two to ten years or so in ponderosa pine forest up until about 1900. Fires tended to burn in dry years across the southwest, and in wet years fires were rare regionally. In the Jemez Mountains, fire as a major force shaping ponderosa pine forests ended around 1893 in response to intense grazing by cattle, goats, and sheep. Livestock grazing beyond a subsistence scale became feasible around this time when the Denver and Río Grande Railroad linked the mountains to the markets.

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Partially thinned demonstration plot in the upper Santa Fé River watershed
(photo courtesy of City of Santa Fé).

(Restoring continued) A couple of interesting exceptions have been observed. Near Cerro Pedernal in the Chama River Valley, fire frequency decreased after 1748, probably because of livestock grazing by Spanish and Genízaro settlers of the Cañones land grant of 1731. Similarly, the cessation of fire after 1752 at three sites on the continental divide near Cuba have been attributed to early sheep grazing by Navajo communities.

With the adoption by the Forest Service of a grazing permit system at the turn of the century, passage of the Taylor Grazing Act in 1934, and other changes in range management, the fine fuels necessary to carry ground fires returned to many areas, but by that time fire suppression was added to the land management toolbox applied to southwestern forests.



Cub Mesa, Gila Wilderness. Ponderosa pine forest with a relatively frequent fire regime (photo John Kramer, Gila NF).

When the ground fires stopped burning, the trees kept growing, and less frequent, more intense forest fires have become the norm. At the lower and upper edges of the ponderosa pine zone, other conifer species have become more prevalent (piñon and juniper at lower elevations, white and Douglas firs at higher elevations), adding ladder fuels and reducing the area that can clearly be called ponderosa pine forest. Fire suppression has become more difficult if not impossible in many areas because of the increasing fuel loads.

Even if all fires could be suppressed (for example, by installing lightning rods on tall pines), better understanding of ecological processes has begun to erode the old paradigm that all fires must be suppressed.



A ponderosa pine stand in the upper Santa Fé River watershed where 1,000-to-2000 little trees per acre create ladder fuels beneath big old pines averaging 15-20 trees per acre (photo courtesy of Santa Fé National Forest).



An area severely burned in the Oso Fire of 1998 (photo Pat Pacheco, Taos Field Office BLM).

Links to Water Quality

In the case of ponderosa pine forests, natural ecological processes may be more supportive of most human uses than current management. A more open, restored, ponderosa pine forest may produce better lumber, better forage for livestock, and better habitat for many wildlife species.

But what is an article on forest restoration doing in a newsletter about water quality? Forest restoration is

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Fish Consumption Guidelines

By Gary Shiffmiller

Due to mercury found in fish living in the surface waters of the state, the New Mexico Department of Health, Environment Department, and the Department of Fish and Game have set fish consumption guidelines according to water body and type and size of fish. The occasional consumer of these fish is at little risk of adverse effects as long as he/she is otherwise in good health. However, the mercury concentrations some fish contain could over a long period of time cause significant, adverse health effects on the kidney, eye, respiratory tract, nervous system, or cause brain damage. Because their nervous systems are still developing, fetuses, infants, and children are at greater risk than adults of the harmful effects of mercury exposure.

Look up the NMED website at www.nmenv.state.nm.us/ under the Surface Water Quality Bureau's Surveillance and Standards Section for specific guidelines. The tables address specific water bodies and classify fish by its size (length). Size is used because the size of a fish is highly correlated with its age. Since mercury bioaccumulates in fish throughout their lifetime, size is a good indication of the amount of mercury a fish will tend to have.

There are no mercury-related health risks from recreational exposure to these waters and the state still encourages activities such as swimming, boating, and camping in and around these water bodies. The state also encourages eating non-contaminated fish as a part of a healthy diet. These guidelines are not legal restrictions, they are only intended to inform the public so they can make informed decisions as to what fish they should eat.

(Restoring continued) proposed to achieve a range of resource goals, including *prevention* of water quality degradation. The main water quality impact that an intense wildfire may have is the dramatically increased runoff following precipitation events. For example, according to the Cerro Grande Fire Burned Area Emergency Rehabilitation report, a peak flow of 1278 cubic feet per second (cfs) is expected in Pueblo Canyon at the Diamond Drive crossing in Los Alamos if a 25 year, 1 hour rain event (equivalent to 1.9" of rain in one hour) occurs. Before the Cerro Grande Fire, the same rain event would have resulted in a mere 9 cfs.

As another example, a maximum peak discharge in Frijoles Canyon on Bandelier National Monument was estimated at 3030 cfs one year after the La Mesa Fire of 1977. Before the fire, the same event would have produced a peak discharge of approximately 19 cfs.

These floods can temporarily tear the life out of a stream, flushing all fish, invertebrates, and much of the riparian vegetation downstream. Flood flows can also widen channels and deliver sediment downstream to other rivers or reservoirs.



Cow Creek after the Viveash Fire (photo courtesy of New Mexico Division of Forestry).

Above normal peak flows can be expected for several years, and then longer lasting effects may linger as the stream channel and vegetation re-establish themselves.

Even if an area doesn't burn, the overgrown forest can have a negative impact on water quality. Many of our forests are leased to ranchers to graze their cattle, and cattle are increasingly being forced into less space, and into riparian areas, because of the sparse understory vegetation that grows under dense forest canopies.

An indirect benefit to water quality may also occur as a result of increased water *quantity* following forest restoration. In a study of ponderosa pine in the Beaver Creek watershed of Arizona, water yield increased at least 15% with one third of the basal area (the cross sectional area of the tree trunks) of pines removed. Water yield gradually decreased over six to ten years to pretreatment levels, but thinned ponderosa pine forest can be inexpensively (and relatively safely) maintained with prescribed fire. Increased water quantity can translate to wet water, more dissolved oxygen, and lower temperatures to support aquatic life.

The Río Embudo Water Quality Improvement Project

The Surface Water Quality Bureau supports restoration of ponderosa pine ecosystems with technical assistance and Clean Water Act Section 319(h) funding where the restoration activity is conducted in part to protect or restore water quality. Staff of the Camino Real Ranger District of the Carson National Forest and the Taos Field Office of the Bureau of Land Management have thinned 463 acres and plan to thin 500 more as part of the Río Embudo Water Quality Improvement Project. The Carson National Forest in April 2000

conducted a prescribed burn of 88 acres as part of the project, and both agencies have conducted additional prescribed burns in May 2001.

Members of the Santa Barbara Grazing Association (which holds the grazing lease for the portion of the project area on Forest Service land) are contributing to the project by temporarily grazing their cows on the Valle Grande Grass Bank, another Forest Service allotment leased by The Conservation Fund, a

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Santa Barbara Grazing Association cows being loaded onto trucks to be sent back home to Peñasco (Photo Abe Franklin).



Thinned and burned forest in the Río Santa Barbara watershed (photo Steve Miranda, Carson National Forest).

(Restoring continued) conservation organization. This is allowing the sparse grasses that persisted under the thick ponderosa pine canopy to multiply, providing fuel for prescribed fire and better range for the cows once they return.

The Upper Santa Fé River Watershed Restoration Project

The Surface Water Quality Bureau is also supporting the Upper Santa Fé River Watershed Restoration Project, which if implemented as proposed will thin approximately 2570 acres (probably followed by prescribed burning) in the 17,384 acre watershed, with another 4700 acres burned under very specific prescription conditions without thinning. This project is planned largely to protect 40% of Santa Fé's municipal water supply.



Partially thinned demonstration plot in the upper Santa Fé River watershed (photo courtesy of City of Santa Fé).

The Future

Clearly these projects alone and others like them cannot feasibly accomplish ponderosa pine restoration in New Mexico. Even with new federal funding becoming available, it may be impractical to restore ponderosa pine forests with repeated mechanical thinning. Over 100,000 acres per year would have to be thinned for twenty years to restore half of New Mexico's 4.7 million acres of ponderosa pine forest. And without adopting prescribed fire,

the expense would have to be repeated, and some management objectives would not be attained (*e.g.*, some ecosystem processes such as effective nutrient release to the understory vegetation would not occur without fire). Education of the public regarding fire safety and the role of fire in ponderosa pine ecosystems, concerted planning efforts among owners and managers of adjacent lands, better understanding of the long-term succession of intensely or moderately burned ponderosa pine forest, and experimentation to reduce costs of thinning will be required to restore our ponderosa pine forests.

For more information on the topic of ponderosa pine forest restoration please consult the Fire Effects Information System entry on ponderosa pine at http://www.fs.fed.us/database/feis/plants/tree/pinpons/fire_ecology.html or call Abe Franklin at 505-827-2793.

New Mexico River Day

By Mike Coleman

An impressive gathering of watershed groups, environmental organizations, and State agencies participated in an exhibition and ceremony at the State Capitol Building, in honor of the *Joint Memorial*.

As introduced by Carlos Cisneros (D, representing Mora, Santa Fe and Taos Counties), the declaration invited the citizens of New Mexico to pause to express our appreciation for our rivers and streams, and to express our concern for the future well being of rivers and all that depend upon them. Speakers at the Roundhouse included Senator Cisneros, Representative Pauline Gubbels (R, Bernalillo), Senator Dede Feldman (D, Bernalillo), and Wilfred Guitierrez of the New Mexico Acequia Commission.

The river displays were sponsored by members of Alliance For Rio Grande Heritage, including Rio Grande Restoration and Amigos Bravos, and included booths from a large cross-section of New Mexicans who value their rivers and streams. The displays illustrated a variety of projects and volunteer efforts including river restoration, water conservation, fish habitat, watershed enhancement, and water-oriented recreational activities.

The Surface Water Quality Bureau constructed a large poster presentation outlining a number of the state's watersheds involved in the Total Maximum Daily Load process, a variety of 319 implementation project photographs, our nonpoint source models of urban and mining settings, and a poster detailing the history and current restoration work being accomplished on the Rio Puerco, south of Cuba, in Sandoval County.

This was an excellent opportunity for outreach, not only to the general public, but also to our elected officials, who need to know the effort many groups are putting forth to preserve and protect our valuable rivers and streams.



Students show their colored rocks to Representative Pauline K Gubbels and Senator Dede Feldman at the State Capitol during River Day. Photo: Peter Monahan

Protecting Riparian Areas On National Forest

By Delbert Trujillo

The New Mexico Environment Department's Surface Water Quality Bureau under the 319 program has been working with the Santa Fe national Forest and the Carson National Forest in Proper Range Management Techniques for the protection of surface water quality on National Forest jurisdiction. This activity is to maintain high water quality level on national forest lands.

Currently the Watershed Protection Section (WPS), (formerly the Nonpoint Source Pollution (NPS) Section), has been working with the Carson and Santa Fe National Forests and their allotment permittees in restoring and upgrading allotment Best Management Practices (BMPs) for the protection of watersheds. The project locations are:

- Rito Penas Negras Allotment of the Cuba Ranger District/Santa Fe National Forest,
- Jarosa Allotment of the Coyote Ranger District/Santa Fe National Forest, and
- Alamosa, Jarita Mesa, Jarocita, and Escondido Allotments of the El Rito Ranger District/Carson National Forest. (The El Rito project is located on the Rio Vallecitos watershed.)

WPS and Forest Service, in conjunction with the allotment permittees and volunteers, have been implementing BMPs to help maintain high water quality levels throughout the watersheds located. Such BMP activities include and are not limited to:

- wildlife pond construction,
- sectional fencing,
- rotational grazing,
- riparian fencing,
- pole plantings (willow),
- trick tank reconstruction, and
- check dam construction.

The purpose of many BMPs is to divert livestock away from riparian environments and have them utilize upland areas that are neglected because of they lack available drinking water sources. These upland areas contain lush grasses and if water is present, ungulates will consume and utilize these areas more frequently. The removal of such grasses can help decrease fire danger during dry periods as well. Furthermore, allotment permittees are instructed in placing cake and salt blocks away from perennial waters. Placing these blocks on upland flat helps to divert livestock away from riparian environments. The cooperation that exists between all interested parties is showing positive results for the allotment environments, which are the focus of the Range Management strategy. Implementing BMPs will help improve both water quality and rangeland sustainability. Stakeholders in these watersheds are learning the benefits of rangeland and watershed improvement practices.



NMED Celebrates a Decade of Service and Earth Day with an Environmental Fair

By Julie Arvidson

April 22nd is usually associated with Earth Day. However, many do not know that the Environment Department became its own Department on that day as well ten years ago. To celebrate these two events, the Environment Department held an Environmental Fair on April 23. Each bureau gave a presentation and prepared a display explaining what their bureau does. The public, children and Department staff were present. Congratulations on 10 great years NMED!

CALENDER OF EVENTS

JUNE

2—Tierra Y Montes Soil, Water, and Conservation District is hosting a Water Expo at Pecos High School from 11:00 AM until 4:00 PM. There will be informational booths on water quality, water storage, water conservation and natural resources. The event is a cultural event as well with arts and crafts, music and food. NMED/EPA section 319(h) is funding the event.

JULY-AUGUST

31-August 2—Western Regions/States NPS Meeting at Town and Country Hotel, 500 Hotel Circle North, San Diego, CA 92108. The purpose is to share information and expertise across regions and states, to discuss federal land issues and improve partnerships between federal and state agencies, and create a forum for discussion of issues relevant to State Management Plan and TMDL implementation. State, Tribal and EPA Region 6, 8, 9, & 10 Nonpoint Source Coordinators and other federal agencies are invited. For more information contact Marquietta Davis, Tetra Tech, Inc. at (703) 385-6000, ext. 167 or davisma@tetrattech-ffx.com.

SEPTEMBER

18-19—EPA Region 6 Nonpoint Source Watershed Conference at the Fairmont Hotel, Dallas, TX. Topics include Water Quality for the Future, Learning from the Past; Public Health; Land Use and Management; Success Stories. State and Regional EPA and USDA staff, members of environmental and stream team groups, hunting and fishing organizations, city managers, public health officials and concerned citizens are invited. To register contact TIAER at info@tiaer.tarleton.edu or call (254) 968-9585

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